Commission always retains the power to alter the terms of existing licenses by rule making.[261] Further, at the time Congress introduced auctions into the licensing process, it made clear that this mechanism for assigning licenses was not intended to change the Commission's basic regulatory role or otherwise provide additional rights to auction-winning licensees.[262] Thus, no auction bidder could have assumed that it was buying a license containing terms that the Commission could not modify.

2. Increasing Power Limits for Certain Services

85. *Background.* In the *Rural NPRM*, the Commission observed that "[i]ncreasing the range of radio systems is one means of making it more economical to provide spectrum-based radio services in rural areas by potentially lowering infrastructure costs," and that "[o]ne way to increase the range of radio systems is by increasing power levels."[263] The Commission accordingly sought comment regarding whether we should modify our regulations governing power limits for operations in rural areas, as a means of encouraging service to these areas. Specifically, the Commission asked whether current power limits should be increased for stations located in rural areas and licensed under Parts 22, 24, 27, 80, 87, 90, and 101 of our rules.[264] The Commission also sought comment regarding the implementation of higher power limits, such as how to define "rural area" for purposes of increased power limits and whether, in the case of base/mobile systems, both the base and mobile stations must be located within a rural area.[265] The Commission further acknowledged that there may be certain challenges in implementing increased power levels in rural areas and sought comment on how increased power might increase the potential for harmful interference to neighboring systems or otherwise limit the number of paths in a given area.[266]

86. *Discussion.* Based on the record in this proceeding, we believe that, in principle, increasing power limits in rural areas can benefit consumers in rural areas by reducing the costs of infrastructure and otherwise making the provision of spectrum-based services to rural areas more economic. When we balance this potential benefit, however, against the potential costs of harmful interference, we recognize that we must act carefully to ensure that increased power limits do not cause harmful interference for other licensees. After reviewing the record and evaluating the technical and operational rules for the various services at issue in this proceeding, we conclude that increasing cellular, PCS, and AWS power limits may provide measurable benefits without creating harmful interference for co-channel or adjacent licensees. As we discuss in the following paragraphs, we find that the current

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[261] *See, e.g., United States v. Storer Broadcasting*, 351 U.S. 192, 205 (1956); *Committee for Effective Cellular Rules v. FCC*, 53 F.3d 1309, 1319-20 (D.C. Cir. 1995).

[262] *See* 47 U.S.C. §§ 309(j)(6)(C) (stating that nothing in the auction statute or use of auctions shall "diminish the authority of the Commission under the other provisions of th[e Communications] Act to regulate or reclaim spectrum licenses"); 309(j)(6)(D) (stating that nothing in the auction statute or use of auctions shall "be construed to convey any rights, including any expectation of renewal of a license, that differs from the rights that apply to other licenses within the same service that were not issued pursuant to this subsection").

[263] *Rural NPRM*, 18 FCC Rcd at 20829-30 ¶ 52.

[264] *Id.* at 20831 ¶ 56.

[265] *Id.* at 20831-32 ¶ 57.

[266] *Id.* at 20831 ¶ 55.

cellular, PCS, and AWS technical and coordination rules (with some modifications) will be sufficient to ensure that licensees are able to utilize increased power levels at certain base stations without causing harmful interference.

87. ***Cellular.*** We amend our regulations governing the Cellular Radiotelephone Service and authorize increased power limits for cellular base stations that either: (1) are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or (2) extend coverage into cellular unserved areas, as those areas are defined in Section 22.949 of the Commission's rules.[267] Specifically, we amend section 22.913(a) of our rules to provide that the Effective Radiated Power (ERP) of such base transmitters must not exceed 1000 Watts.[268] This power increase doubles permissible ERP for selected cellular base stations; prior to this amendment, section 22.913(a) provided that the ERP of base transmitters and cellular repeaters must not exceed 500 Watts.[269] We recognize that a "one size fits all" approach to spectrum management is unlikely to yield optimal spectral efficiency and that, particularly in areas where there is less congestion or where other unique factors are present, it is appropriate to amend our operating parameters to afford licensees greater flexibility. As the Spectrum Policy Task Force noted, "spectrum policy must evolve towards more flexible and market-oriented regulatory models," in order "[t]o increase opportunities for technologically innovative and economically efficient spectrum use."[270] Our action today is consistent with the recommendations of the Spectrum Policy Task Force, which advised that the Commission explore ways of promoting spectrum access and flexibility in rural areas, and stated that the Commission's interference and other technical rules should "afford spectrum users the flexibility to operate at higher power in less congested areas, which are typically rural, so long as such higher power operations do not cause interference and do not receive additional interference protection."[271]

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[267] 47 C.F.R. § 22.949. "Unserved area" is defined as a geographic area that is not within the CGSA of any cellular system authorized to transmit on that channel block. The CGSA is the geographic area served by a cellular system, within which that system is entitled to protection. *See id.*

[268] Note that we are not increasing power limits for cellular base stations that are located in counties with population densities that are greater than 100 persons per square mile, *unless* those base stations are providing coverage to otherwise unserved areas. If a cellular base station is not located in a county with a population density of 100 persons or fewer per square mile, or providing service to an unserved area, the ERP of the cellular base station must not exceed 500 Watts.

[269] 47 C.F.R. § 22.913(a). We note that, to the extent that a power increase results in cellular coverage that extends beyond the licensee's protected CGSA, this additional coverage area does *not* automatically become part of the licensee's CGSA. Cellular carriers must continue to comply with our regulations regarding cellular unserved areas. Cellular carriers may extend coverage into adjacent unserved areas without prior Commission approval, provided that the extension is less than 50 square miles and the Commission is notified of any such extension. Further, any such extension is on a secondary basis only and does not become a part of the licensee's CGSA unless the licensee files a major modification application. *See* Year 2000 Biennial Regulatory Review – Amendment of Part 22 of the Commission's Rules To Modify or Eliminate Outdated Rules Affecting the Cellular Radiotelephone Service and Other Commercial Mobile Radio Services, WT Docket No. 01-08, *Order on Reconsideration*, 19 FCC Rcd 3239, 3256-57 ¶ 41 (2004).

[270] *SPTF Report* at 3.

[271] *Id.* at 59.

88. We believe that this amendment of our regulations governing cellular power limits will promote coverage to rural areas by making it more economical to provide service to these areas. As a result of this power increase, cellular licensees may be able to extend their coverage area and use fewer base stations, thereby lowering their infrastructure costs. As commenters such as OPASTCO/RTG noted, "[r]elaxed limits for licensed operations will provide much-needed relief to rural operators by substantially reducing the costs associated with construction of such systems."[272] We estimate that increasing authorized base station power limits to 1,000 Watts ERP may increase the distance to the licensee's Service Area Boundary (SAB) by as much as 12.5 percent and may increase overall coverage area by as much as 26.6 percent.[273] Consequently, we estimate that, as a result of this power increase, licensees may require up to 21 percent fewer cell sites to provide the same coverage with 1,000 Watts ERP as previously provided with 500 Watts ERP.

89. We limit this power increase to cellular base stations that are located in rural areas or that are providing coverage to unserved areas. We define "rural areas" for purposes of increased power limits as counties with a population density of 100 persons per square mile or less. Specifically, permitting power increases in areas where the population density is 100 persons or less captures much of the geographic area where service is not provided by both the A- and B-block cellular carriers (or, in some instances, by either cellular carrier). After conducting an analysis of current cellular licenses in the United States, we have determined that there are 625 counties that have some area that is not covered by the license of an A-block and/or B-block cellular provider. Of these 625 counties, 577 of these counties have a population density of 100 persons per square mile or less.[274] As an additional matter, in order to promote cellular coverage to areas that lack cellular service but otherwise are not captured by this definition of "rural area," we amend our rules to permit carriers to use higher power at base stations located in counties with a greater population density, provided those base stations are providing coverage to unserved areas, as defined by our rules.[275] We also limit this power increase to cellular base stations more than 72 kilometers (45 miles) from the Mexican and Canadian borders, consistent with our current

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[272] OPASTCO/RTG Comments at 6-7; *see also* Blooston Comments at 18 (generally supporting increased power levels and stating that "[a] major consideration in any rural system design is cost"); *see also* Ericsson Reply at 6 (stating that increased power limits "would improve service and coverage areas without requiring as many base stations, thus improving economic feasibility of such systems"); *see also* National Rural Telecommunication Comments at 6 (stating that "increasing the range of radio systems through increased power levels is one means of making it more economical to provide spectrum-based radio services in rural areas"); *see also* RCA Comments at 9.

[273] These calculations are based on our standard formula for determining the distance from a cell transmitting antenna to the SAB, as set forth in section 22.911(a) of our rules. *See* 47 C.F.R. § 22.911(a).

[274] We note that, of these 577 counties, 536 are located within RSAs. We adopt a definition of "rural area" based on population density, rather than adopting an alternative definition such as RSAs, because this population density-based definition captures a greater percentage of the area where consumers do not have coverage by the A- and/or B-block cellular provider.

[275] *See* 47 C.F.R. § 22.99. As we state earlier, cellular carriers must continue to comply with our unserved area rules. *See supra* ¶ 89. An extension into adjacent unserved areas is permitted without prior Commission approval, provided the Commission is notified and the extension is less than 50 square miles. These extensions are on a secondary basis. A licensee must file a major modification application if it would like to incorporate this new area into its CGSA.

agreements with those countries.[276]

90. We note that commenters expressed concern that higher power limits might result in harmful interference to other licensees.[277] Some commenters urged the Commission to conduct interference studies[278] or otherwise "further investigate the possibility of increasing power levels in rural areas, in a manner that responsibly addresses any potential interference concerns."[279] Further, some commenters urged the Commission to refrain from increasing power limits due to the potential for harmful interference or other detrimental effects on other services.[280] We have carefully considered the concerns raised by commenters and believe that this limited amendment of our cellular rules will increase licensee flexibility without increasing the likelihood of harmful interference. Our regulations governing the provision of cellular service already contain specific safeguards that are designed to minimize the likelihood of harmful interference by clearly defining protected service areas for each cell site, and requiring licensee coordination near system boundaries. We find that applying these same requirements to higher power base stations will minimize the potential for harmful interference. Specifically, the Service Area Boundary (SAB) of each cellular base station is defined by a formula based on antenna height and transmitter power, and the formula's underlying assumptions are still valid for power levels up to 1000 Watts.[281] Using the existing formula, the SAB distance for a particular base station will increase as the power level increases. However, because the rules prevent a base station SAB from overlapping other licensees' CGSAs, such power increases will only be permitted so long as they do not infringe upon other licensees' systems.[282] One example of how increased power may be utilized under these restrictions is where a licensee seeks to extend service into currently unserved areas. Because the areas are unserved by other carriers, the SAB increase will not overlap any other licensee's CGSA. Another example could be where a carrier wishes to improve service quality by increase signal levels within their own CGSA. In other words, the SAB increase for the particular base station would be completely within the licensee's CGSA, and therefore would not infringe upon other licensees' CGSAs.

91. As an additional safeguard, the Commission's rules currently provide that licensees must coordinate channel usage at each transmitter location within 75 miles of any transmitter locations authorized to other licensees or proposed by tentative selectees or other applicants.[283] This requirement

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[276] 47 C.F.R. §§ 22.955 and 22.957.

[277] *See* ITA Reply Comments at 9; *see also* Western Wireless Reply Comments at 11; *see also* Nextel Partners Reply Comments at 14 (stating that limits on power levels should not be relaxed in rural areas, due to interference issues).

[278] ITA Reply Comments at 9.

[279] CTIA Comments at 10.

[280] For example, Nextel Partners stated that "[h]igher power limits result in greater potential interference, less potential for re-use of spectrum in adjacent or nearby areas, and, for higher-powered handsets, systematic problems that may arise when such handsets are transported to an urban environment." *See* Nextel Partners Comments at 19.

[281] 47 C.F.R. § 22.911(a).

[282] *Id.* § 22.911(d).

[283] *See id.* § 22.907(a). Licensees are not obligated to coordinate with other mutually exclusive applicants. *Id.*

recognizes that the SAB/CGSA overlap restriction described above permits licensees to provide service quality signal levels up to the edge of another licensee's system boundary. While this approach facilitates seamless coverage for consumers, it requires careful coordination among neighboring licensees in order to avoid interference. For years licensees have been coordinating system frequency plans with one another in order to ensure high levels of service quality and seamless roaming along system boundaries. Going forward, we believe this coordination requirement will perform equally well in coordinating high power operations.

92. Our decision here to authorize higher power levels for cellular licensees, subject to certain safeguards to protect other cellular services does not diminish in any way the obligations we impose today on cellular licensees in the *800 MHz Order* to protect public safety and other non-cellular operations in the adjacent 800 MHz band from interference.[284] As explained in detail in that Order, we adopt a specific standard defining "unacceptable interference" to such operations in that band and require other licensees, including cellular licensees, to immediately take all steps necessary, including the implementation of Enhanced Best Practices, to abate such interference.[285] Cellular licensees wishing to utilize the increased power levels authorized in this Order can do so only to the extent that they also remain in compliance with their *800 MHz Order* obligations.

93. Several commenters stated that increased power limits would not necessarily facilitate increased coverage due to handset limitations or other technical constraints.[286] The Commission acknowledged this concern in the *Rural NPRM*, stating that "increasing the base station power level may not improve the communications range unless the mobile unit [or handset] is capable of returning a signal to the base station antenna."[287] Although increasing the power of the handset might address this issue by increasing the mobile unit's ability to "talk" to the base station, several commenters indicated that increasing handset power would be problematic, in light of the fact that a handset is likely to be used in urban as well as rural areas and might introduce interference concerns if used in an urban setting.[288] We agree with these commenters and find that there is no need to increase handset power limits at this time. We do not believe that increasing handset power is necessary, however, in order for cellular licensees to benefit from increased power limits. First, nearly all cellular phones on the market today operate at power levels well under the maximum permitted under our rules, which suggests that our regulations already permit sufficient handset power. Today's handsets generally utilize low power in order to

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[284] Improving Public Safety Communications in the 800 MHz Band Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels, WT Docket No. 02-55, *Report and Order, Fourth Report and Order, Memorandum Opinion and Order, and Order,* FCC 04-168 (rel. August 6, 2004) (*800 MHz Report and Order*). Public safety receivers operate in the 806-824 MHz and 851-869 MHz bands. We note that these bands are not, in their entirety, allocated for public safety use. Public safety systems have exclusive use of channels in the 821-824 MHz 866-869 MHz band segment and share channels with other services in the 809.75-816 MHz /854.75-861 MHz band segment. *See also* Improving Public Safety Communications in the 800 MHz Band; Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels, WT Docket No. 02-55, *Notice of Proposed Rulemaking*, 17 FCC Rcd 4873 (2002) (*800 MHz NPRM*).

[285] *See* generally *800 MHz Report & Order* at ¶¶ 19, 88-132.

[286] *See* Blooston Comments at 18; *see also* ITA Comments at 9; *see also* Western Wireless Reply Comments at 11.

[287] *Rural NPRM*, 18 FCC Rcd at 20830 ¶ 52.

[288] *See* Nextel Partners Reply Comments at 14; *see also* CTIA Comments at 9.

comply with our RF safety rules and to extend battery life. Second, cellular licensees may overcome handset constraints by employing an external means of boosting the handset's signal, or by adding amplifiers at the base station to boost the received signal. For example, a cellular carrier may use an external amplifier or otherwise use a tower top amplifier at the base station. In any case, cellular technology continues to develop and we expect that technical limitations may diminish over time as technology evolves. Further, our action affords licensees with additional flexibility to take advantage of new technological advancements without being unduly constrained by Commission requirements.

94. In addition, we note that some wireless carriers are considering the use of directional antennas to improve network performance,[289] and that such antennas have the potential to help improve communications in rural areas by achieving higher gain, mitigating the effects of multipath, improving frequency bandwidth performance, and providing better directional control over emissions.[290] As such, directional handset antennas would provide improved reception quality at the cellular tower receiver, significant improvement of voice quality near the edge of a cell, potentially larger cell sites with fewer base stations, and lower power consumption in handsets, improving battery life.[291] Although handsets that employ directional antennas may need to be slightly reoriented when used in certain locations, techniques such as antenna diversity are being considered to combat large-scale fading effects caused by shadowing from large obstacles (*e.g.*, buildings or other terrain features).[292] Because directional handset antennas have the potential to significantly increase the strength of signals transmitted from handsets, as well as provide efficiency benefits both to the wireless network and to battery life, there are several benefits that could be gained from their increased use in handsets.[293] Importantly, directional handset antennas, coupled with an increase in base stations' transmitted power, have the potential to significantly improve wireless communications in many rural areas.

95. ***Broadband PCS.*** Similar to our treatment of cellular above, we will provide for increased power limits for broadband PCS.[294] Specifically, we increase power levels by 100 percent for

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[289] Some carriers are considering deploying directional phone and base stations antennas in so-called "diversity schemes" in order to improve wireless system performance and reduce the number of base stations needed. *See* D. McDonough, Jr., "Building a Better Wireless Antenna," *Wireless News Factor,* June 5, 2002 (visited June 9, 2004) <http://www.skycross.com/WNF_06052002.asp>. *See also* C. Beckman, "Development Trends in Antennas for Mobile Phones," Portable 2001 Conference, February 13-15, 2001, San Jose, CA (visited June 9, 2004) http://www.s3.kth.se/signal/edu/seminar/01/Portable2000.pdf>; J. H. Winters, "Smart Antennas for Wireless Systems," *IEEE Personal Communications,* February 1998 at 23-27; F. Viquez, "Smart Antenna Deployment in Next-Generation Wireless Systems" (visited June 9, 2003) <http://www.base-earth.com/march-april2002/allied.html>.

[290] *See Rural NPRM,* 18 FCC Rcd at 20829-30 ¶ 52.

[291] *See* F.M. Caimi, Ph.D., Senior Scientist, "MLA Antennas – Physically Small, Electrically Large," Skycross, Inc., 2003 (visited June 9, 2004) <http://www.skycross.com/MLA_antenna.asp>.

[292] *See* A.J. Paulraj, D. Gesbert, C. Papadias, "Smart Antennas for Mobile Communications," *Paulraj, Gesbert, Papadias Encyclopedia for Electrical Engineering*, John Wiley Publishing Co., 2000, available at <http://heim.ifi.uio.no/~gesbert/papers/encyclopedia_chapter.pdf> (visited Mar. 5, 2003).

[293] Of course, manufacturers would still need to comply with the RF safety rules contained in Part 2 of the Commission's rules. *See* 47 C.F.R. Part 2, Subpart J, of the Commission's rules.

[294] *See* 47 C.F.R. § 24.232.

broadband PCS base stations located in rural areas, in parity with the cellular power levels adopted in this proceeding. We note that broadband PCS power levels are tied to antenna heights, so that the authorized power for a given broadband PCS base station would vary, depending upon the accompanying antenna height.[295] For example, a base station with an antenna with a height above average terrain (HAAT) of 300 meters or less may operate at a maximum of 1640 watts peak equivalent isotropically radiated power (EIRP). Thus, for base stations of 300 meters or less in rural areas, we will allow an increase from 1640 to 3280 watts EIRP.

96. As with the modification of our cellular regulations, we believe that this modification of our PCS regulations will allow licensees to increase their coverage while using fewer base stations, thereby reducing the costs of providing service to rural areas. We estimate that permitting broadband PCS licensees to increase their power by 100 percent will increase the distance from the base station to the edge of their coverage area by 17 percent and will increase the overall coverage area by 36 percent.[296] As a result, we estimate that a broadband PCS licensee using increased power will require 27 percent fewer sites in order to provide the same coverage provided using current power limits.

97. We find that the current market-boundary signal strength limit, in conjunction with a coordination requirement, will minimize the potential for harmful interference among licensees. Currently, broadband PCS licensees cannot exceed a signal strength of 47 dBμV/m at their geographic market-boundary unless neighboring licensees agree to a higher level.[297] This means that, regardless of the location, height, or power level of broadband PCS base stations, the signal level at the market-boundary may not exceed this maximum level without mutual agreement. Therefore, we find that permitting a 100 percent increase in power levels at broadband PCS base stations will not increase the potential for harmful interference beyond what exists today. At the same time, we note that the 47 dBμV/m limit is a "service quality" signal level that promotes coverage up to the edge of the market boundary, and seamless roaming across market boundaries in certain instances. In other words, although there is no formal coordination requirement, neighboring licensees must as a practical matter coordinate frequency plans and site locations along market boundaries in order to avoid interference. As a cautionary measure, we will require that licensees using higher power levels coordinate operations with all licensees within 75 miles of the relevant base station. This requirement will supplement the existing signal strength limit and underscore our intention that licensees must coordinate spectrum usage along

[295] We are revising Section 24.232 to provide 100 percent power increases as a function of height as follows: for antennas of 300 feet increase from 1640 to 3280 watts, for antennas of 500 feet increase from 1070 to 2140 watts, for antennas of 1,000 feet increase from 490 to 980 watts, for antennas of 1500 feet increase from 270 to 540 watts, and for antennas of 2,000 feet increase from 160 to 320 watts.

[296] We based these calculations on a theoretical system placed in rural, western Kansas. We utilized the Okumura-Hata propagation model assuming a 1900 MHz PCS base transmitter, flat terrain, average height AMSL of 230 m, open clutter, omni-directional antennas (9 dBd gain), antenna centerline (all sites) of 60 m AGL, mobile height of 3m, received signal level of –102 dBm, and mobile power of 0.8 watts EIRP. The Okumura-Hata propagation model makes use of numerous correction factors, including adjustments for the degree of urbanization, terrain slope and roughness, receiver location relative to nearby hills and valleys, general street orientation in the service area, and localized obstructions. *See* Okumura, Y., E. Ohmori, T. Kawano, and K. Fukuda, "Field strength and its variability in VHF and UHF land-mobile radio service," *Rev. Elec. Com. Lab.* 16 at 825-73 (Sep./Oct. 1968)) *and* M. Hata, "Empirical formula for propagation loss in land mobile radio services," *IEEE Trans. Veh. Techol.*, vol 29, pp. 317-325, Aug. 1980.

[297] 47 C.F.R. § 24.236.

common boundaries. We note that this power increase applies only to broadband PCS base stations, and not to mobile units.[298] For the reasons stated above for the 800 MHz cellular service, we find that there is not reason to increase mobile power levels at this time.

98. We also note that the Commission is taking steps to address interference concerns more generally and that these additional measures might protect other licensees from harmful interference.[299] We are optimistic that these initiatives might effectively address interference concerns in a flexible manner and alleviate the need to impose detailed, service-specific coordination requirements.

99. Finally, as we did with 800 MHz cellular, we limit this power increase to broadband PCS base stations located in counties with population densities of less than 100 persons per square mile and those located more than 75 miles from the Mexican and Canadian borders. As stated above, we find that a majority of areas likely to be unserved or underserved are located in such counties. Further, because our existing agreements with Mexico and Canada are based on the prior maximum power limits, we retain those limits for border areas.[300]

100. ***AWS.*** In the *AWS Report and Order*, the Commission adopted the PCS power limit of 1640 watt EIRP for AWS base stations. The Commission noted, however, that the *Rural NPRM* had proposed an increase in the power limit for PCS operations in rural areas and indicated that, in the event we adopted higher power limits for PCS services, we would "explore the possibility of similar power increases for AWS."[301] Thus, similar to our treatment of cellular and broadband PCS above, we will

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[298] We retain the current 2 watts EIRP limit for broadband PCS mobile and portable units. *See* 47 C.F.R. § 24.232(b).

[299] *See* Interference Immunity Performance Specifications For Radio Receivers, ET Docket No. 03-65, Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television, MM Docket No. 00-39, *Notice of Inquiry,* 18 FCC Rcd 6039 (2003) (*Receiver Performance NOI*) (a proceeding that considers incorporation of receiver interference immunity performance specifications in its spectrum policy). In the *Receiver Performance NOI,* the Commission stated that, "[i]n many cases, the effects of RF interference can be mitigated or eliminated through attention to receiver hardware design and signal processing software." *Id.* at 6042 ¶ 10. In addition, the Commission also recently initiated a proceeding that seeks comment on a potential new way to assess interference among different services, called "interference temperature." *See* Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile And Satellite Frequency Bands, ET Docket No. 03-237, *Notice of Inquiry and Notice of Proposed Rulemaking*, 18 FCC Rcd 25309 (2003). As the Commission noted in that proceeding, "[t]his new approach could provide radio service licensees with greater certainty regarding the maximum permissible interference, and greater protections against harmful interference that could be present in the frequency bands in which they operate." *Id.* at 25310 ¶ 1.

[300] Interim Sharing Arrangement Concerning the Use of the 1850 to 1990 MHz Band for Personal Communications Services along the United States and Canadian Border, Nov. 14, 1994, Industry Canada-Federal Communications Commission, 4.2 (agreeing to require coordination of all PCS systems within 120 km (75 miles) of border), http://www.fcc.gov/ib/sand/agree/files/can-nb/pcs-bb.pdf ; Protocol Concerning the Use of the Band 1850-1990 MHz for Personal Communications Services along the United States and Mexican Border, 4.2(agreeing to require coordination of all PCS systems located within 72 km (45 miles) of the border), http://www.fcc.gov/ib/sand/agree/files/mex-nb/pcs1850e.pdf.

[301] Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Report and Order*, 18 FCC Rcd 25162, 25202 ¶ 102 n. 265 (2003) (*AWS Report and Order*).

provide for increased power limits for AWS. Specifically, we increase power levels for AWS base stations located in rural areas by 100 percent, or up to 3280 watts EIRP in parity with the cellular and broadband PCS power levels adopted in this proceeding.

101. As with the modification of our cellular and broadband PCS regulations, we believe that this modification of our AWS regulations will allow licensees to increase their coverage while using fewer base stations, thereby reducing the costs of providing service to rural areas. We estimate that increasing authorized base station power limits to 3280 Watts EIRP may increase the distance to the licensee's edge of coverage by as much as 17 percent and may increase overall coverage area by as much as 36 percent.[302] Consequently, we estimate that, as a result of this power increase, licensees may require up to 27 percent fewer cell sites to provide the same coverage with 3,280 Watts EIRP as previously provided with 1640 Watts EIRP. We estimate that permitting AWS licensees to increase their power by 100 percent will increase the distance from the base station to the edge of their coverage area in an amount similar to broadband PCS, thereby requiring fewer sites in order to provide the same coverage provided using current power limits. As with broadband PCS, we find that the current market-boundary signal strength limit[303], in conjunction with a coordination requirement, will minimize the potential for harmful interference among AWS licensees, and licensees in neighboring bands.[304] Therefore, as a cautionary measure, we will require that licensees using higher power levels coordinate operations with all affected licensees within 75 miles of the relevant base station and with certain satellite entities.[305] As with broadband PCS, this requirement will supplement the existing signal strength limit and underscore our intention that licensees must coordinate spectrum usage along common boundaries. We note that this power increase applies only to AWS base stations, and not to mobile units. For the reasons stated above for the 800 MHz cellular service, we find that there is not reason to increase mobile power levels at this time. Finally, as we did with broadband PCS, we limit this power increase to AWS base stations located in counties with population densities of less than 100 persons per square mile. As stated above, we find that a majority of areas likely to be unserved or underserved are located in such counties.

102. ***Other Radio Services.*** At this time we will not adopt increased power levels in other radio services. We note that several commenters opposed increases in power limits or otherwise expressed concern with respect to changes to specific service rules. For example, XM Radio Inc. asked the Commission "to refrain from taking any action . . . to increase the power limits of 2.3 GHz [Wireless

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[302] *See supra* note 297.

[303] 47 C.F.R. § 27.55.

[304] AWS base stations will transmit in the 2110-2155 MHz band, which currently contains Part 101 fixed, point-to-point microwave and Part 21 MDS operations. Furthermore, the spectrum below the 2110-2155 MHz band contains various satellite services, as well as Broadcast Auxiliary Service (BAS), which is licensed under Part 74 of our rules, and Cable Television Relay Service (CARS) operations, which is licensed under Part 78 of our rules. The spectrum above the AWS frequencies, the 2155-2160 MHz band, contains Part 21 MDS operations.

[305] At present, AWS licensees already must coordinate with nearby, incumbent co-channel and adjacent channel Part 101 and MDS licensees. Due to concern about the possibility of both out-of-band emission (OOBE) and receiver overload interference from AWS base stations to BAS and CARS operations, the Commission also has decided that AWS licensees must coordinate their operations with affected BAS and CARS licensees. In addition to these existing coordination requirements, higher power AWS operations must also be coordinated with adjacent channel AWS licensees, Part 21 MDS licensees operating above 2155 MHz, as well as all Government and non-Government satellite entities operating in the 2025-2110 MHz band.

Communications Services] facilities,"[306] noting that no commenter has expressly supported a power increase for these facilities and that "no entity has made a showing that authorizing an increase in the power of 2.3 GHz WCS facilities in rural areas will not cause harmful interference to [Satellite Digital Audio Radio Service] repeaters."[307] Similarly, HNS expressed concern with respect to increasing power for those terrestrial wireless services that share spectrum with satellite operations.[308] We note that many bands are shared by fixed terrestrial and satellite operations on a coordinated basis and allowing increased power for existing operations could foil the coordinated sharing situation.[309] In light of the fact that we did not receive supporting comments by those who would stand to benefit from such power increases, we decline to modify power levels for: (1) 2.3 GHz WCS facilities; or (2) licensed terrestrial services that operate in frequency bands that are shared by satellite services.

103. We also decline MDS America's request that the Commission adopt higher power limits and increased operating parameters for the Multichannel Video Distribution and Data Service (MVDDS).[310] First, the Commission expressly excluded MVDDS stations licensed under Part 101 from the scope of its power limits inquiry, noting that the Commission recently increased power levels for all MVDDS stations in a separate proceeding.[311] Second, we agree with commenters that MDS America's request constitutes a late-filed petition for reconsideration of this prior Commission action.[312] Furthermore, we decline to take any action with respect to unlicensed services in this proceeding. We will incorporate comments addressing power limits for unlicensed services into the record of the Cognitive Radio NPRM and will respond to these comments in the context of that proceeding.[313]

104. In conclusion, we decline to adopt increased power limits for any of the other radio services for which we sought comment in the *Rural NPRM*, due to lack of support in the record. We note, however, that licensees in these services may file a request for waiver of these power limits. We will entertain waiver requests on a case-by-case basis. Any such waiver request should demonstrate how a waiver of our power limits will promote the public interest. In addition, licensees seeking to obtain a waiver of our power limits must adequately address any potential interference concerns that may arise as a result of such increased power.

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[306] XM Reply Comments at 3.

[307] *Id.* at 2.

[308] *See* HNS Reply Comments at 3-5.

[309] At the same time, we believe that new fixed terrestrial operations may be able to be coordinated into a rural area with increased power, if necessary, without impacting existing satellite operations.

[310] *See* MDS America Comments at 2-8.

[311] *See Rural NPRM*, 18 FCC Rcd at 20831 n. 119 (citing Amendment of Parts 2 and 25 of the Commission's Rules To Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range; Amendment of the Commission's Rules To Authorize Subsidiary Terrestrial use of the 12.2 – 12.7 GHz Band by Direct Broadcast Satellite Licensees and their Affiliates; and Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. To Provide a Fixed Service in the 12.2 – 12.7 GHz Band, *Fourth Memorandum Opinion and Order*, 18 FCC Rcd 8428 (2003)).

[312] *See* DIRECTV Reply Comments at 3, Skybridge Reply Comments at 2.

[313] *See Cognitive Radio NPRM* at ¶¶ 36-47.

3. Infrastructure Sharing

105. *Background.* The *Rural NPRM* sought comment on whether clarifying the Commission's policy on infrastructure sharing may promote service in rural markets.[314] The Commission also stated that certain carriers in the United States have entered into sharing arrangements,[315] and sought comment on the extent to which infrastructure sharing would promote service in rural areas and on the costs and benefits associated with such arrangements in the context of competition.[316] Infrastructure sharing offers the potential for wireless service providers to share facilities and other infrastructure in order to provide spectrum-based services on a more cost-effective basis, including service to rural areas.[317] A key objective underlying such arrangements is the possible reduction in costs of capital construction in rural areas,[318] and the creation of opportunities for enhanced and expanded coverage.[319] A number of infrastructure sharing arrangements have been entered into in the United States, and some of the parties to such transactions have claimed that these lead to lower costs associated with expanded geographic coverage.[320] Generally, because there are fewer providers in rural areas than in more populated areas, infrastructure sharing may permit more providers to operate in rural areas and thus encourage more competitors to enter those markets.[321]

106. As noted in the *Rural NPRM*, infrastructure sharing includes sharing of infrastructure-related equipment, including antennas, towers, and network elements such as switches and nodes.[322] Commission rules and policies, including our environmental rules,[323] have enabled the sharing of towers and other antenna support structures for the provision of spectrum based services by multiple service providers. Moreover, the Commission has both facilitated and encouraged the collocation of antennas on existing towers.[324] Existing operators have taken advantage of these policies to enter into tower sharing

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[314] *See Rural NPRM*, 18 FCC Rcd at 20849-53 ¶¶ 100-08.

[315] *Id.* at 20849-50 ¶ 101.

[316] *Id.* at 20851 ¶¶ 106-107

[317] *See id.* at 20849 ¶ 100.

[318] *Id.*; RCA Comments at 14, NTCH Comments at 2-3, CTIA Comments at 15, Western Wireless Reply Comments at 10. *See also* T-Mobile Reply Comments at 3 (commenting on potential cost efficiency).

[319] *Cf.* CTIA Comments at 15-16, RCA Comments at 14.

[320] *See Rural NPRM*, 18 FCC Rcd at 20849-50 ¶ 101 (citing *Eighth Competition Report*, 18 FCC Rcd at 14808 ¶ 46) (identifying AT&T Wireless/Sprint agreement to cooperate in the construction of new wireless towers).

[321] *See Rural NPRM*, 18 FCC Rcd at 20850-51 ¶ 104.

[322] *Id.* at 20849 ¶ 100.

[323] *See* 47 CFR § 1.1306 n. 1 (providing that "[t]he use of existing buildings, towers or corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged.").

[324] *See* Nationwide Programmatic Agreement for the Collocation of Wireless Antennas, executed by the FCC, the National Conference of State Historic Preservation Officers, and the Advisory Counsel for Historic Preservation (Mar. 16, 2001), published at 66 Fed. Reg. 17554 (Apr. 2, 2001) (*Antenna Collocation Programmatic Agreement*)

(continued....)

arrangements.[325] Indeed, some companies have made a business of constructing and maintaining towers on which multiple licensees can locate their transmitters and receivers.[326]

107. In addition to these infrastructure sharing arrangements, parties may also be able to expand or improve service to rural areas through spectrum leasing arrangements – whereby licensees in effect share the use of their licensed spectrum with spectrum lessees – under the policies, rules, and procedures established in the *Secondary Markets* proceeding.[327] In the *Secondary Markets Report and Order*, the Commission established policies and rules to enable spectrum users in most wireless radio services to gain access to licensed spectrum by entering into different types of spectrum leasing arrangements with licensees, and streamlined its approval procedures for license assignments and transfers of control.[328] Also, in the companion *Secondary Markets Second Report and Order*, we clarify that spectrum leasing parties may enter into a variety of dynamic leasing arrangements in which licensees and spectrum lessees share the use of the same licensed spectrum.[329]

108. Depending on their structure, infrastructure sharing arrangements may raise transfer of control considerations under Section 310(d) of the Communications Act, as amended.[330] Under that statute, prior Commission approval is required to transfer control of or assign licenses (or parts of licenses, where permitted) to third parties. For many licensees in the wireless radio services, the Commission has interpreted Section 310(d) *de facto* control requirements pursuant to its *Intermountain Microwave* decision,[331] which focuses on whether the licensee, as opposed to an unlicensed third party, exercises close working control over different aspects of the operation of the station facilities that use the spectrum. Specifically, the Commission applied six factors for determining who has *de facto* control by examining whether a licensee: (1) has unfettered use of all station facilities and equipment; (2) controls

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(Continued from previous page)

(stating that "the FCC encourages collocation of antennas where technically and economically feasible, in order to reduce the need for new tower construction.").

[325] *See Eighth Competition Report*, 18 FCC Rcd at 14808 ¶ 46 (identifying AT&T Wireless/Sprint agreement to cooperate in the construction of new wireless towers); *Rural NPRM*, 18 FCC Rcd at 20849-50 ¶ 101.

[326] *See, e.g.*, "Crown Castle International, Products & Services, Towers & Rooftops," < http://www.crowncastle.com/services/sites/rooftop.shtml> (tower builder discussing benefits from building one structure or site that can be shared by multiple users); "American Tower Corporation, Services," http://www.americantower.com/mainweb/colocation.asp> (tower builder stating that collocation is available through leasing for carriers faced with increased capital costs and the need for speedy access to markets). In addition, antenna structure owners are ultimately responsible for compliance with the Commission's rules regarding antenna structure registration, painting and lighting of the structures. See 47 C.F.R. §§ 17.2(c), 17.4, 17.6.

[327] *See generally Secondary Markets Report and Order*, 18 FCC Rcd at 20604.

[328] *See id.* at 20607-85 ¶¶ 1-203.

[329] *See Secondary Markets Second Report and Order* at ¶¶ 10-84.

[330] 47 U.S.C. § 310(d).

[331] *Intermountain Microwave*, 12 FCC 2d 559 (1963).

daily operations; (3) determines and carries out the policy decisions (including preparation and filing of applications with the Commission); (4) is in charge of employment, supervision and dismissal of personnel operating the facilities; (5) is in charge of the payment of financial obligations, including expenses arising out of operations; and (6) receives the monies and profits from the operation of the facilities.[332] Under *Intermountain Microwave*, the Commission has interpreted Section 310(d) *de facto* control to require that the licensees exercise close working control of both the actual facilities/equipment operating the radiofrequency (RF) energy and the policy decisions, *e.g.*, business decisions, regarding use of the spectrum.

109. In its *Secondary Markets Report and Order*, the Commission determined that, in the context of spectrum leasing, it would replace the *Intermountain Microwave* standard with a more flexible standard for determining whether there has been a transfer of *de facto* control under Section 310(d). Under the new *de facto* control standard adopted in that proceeding, we no longer require that, when leasing spectrum, licensees exercise close working control over station facilities, determine the services that are provided, or set the policies affecting the station(s) operating with the spectrum licensed to them under their authorizations.[333] Instead, the Commission determined that licensees in applicable wireless services may lease spectrum usage rights to spectrum lessees, without the need for prior Commission approval, so long as the licensee continues to exercise effective working control over the use of the spectrum it leases.[334]

110. The *Rural NPRM* stated that, where infrastructure sharing arrangements do not involve a transfer of control of licensed spectrum usage rights under Section 310(d), Commission review is not required, but that infrastructure sharing arrangements that involve a transfer of control under Section 310(d) require Commission review.[335] The Commission noted that in the *Secondary Markets* proceeding it has streamlined the transfer of control and assignment process, and sought comment in the *Rural NPRM* on whether other steps may be taken that could further streamline this process.[336] Comment was sought on the factors to consider in evaluating infrastructure sharing arrangements that require Section 310(d) approval in order to effectively balance competition among providers and expanded coverage in rural areas.[337]

111. A number of comments generally support infrastructure sharing,[338] and state that costs

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[332] *Id.* at 559-60.

[333] *Secondary Markets Report and Order*, 18 FCC Rcd at 20635 ¶ 64.

[334] *Id.* at 20635-36 ¶ 65. We also require that the Commission be notified of the spectrum leasing arrangement and the identity of the spectrum lessee. *Id.* at 20659-60 ¶124.

[335] *Rural NPRM,* 18 FCC Rcd at 20850 ¶ 102.

[336] *Id.* at 20851 ¶ 105.

[337] *Id.* at 20851 ¶ 107.

[338] *See* RCA Comments at 14, NTCH Comments at 2, Ericsson Reply Comments at 2, CTIA Comments at 15, USCC Comments at 2, 8, T-Mobile Reply Comments at 3, OPASTCO/RTG Comments at 13, Cingular at 6.

are reduced and access may be improved as a result of such sharing arrangements.[339] Some commenters ask us to clarify that infrastructure sharing arrangements will not be reviewed using the *de facto* control standard as interpreted by the Commission in *Intermountain Microwave* for purposes of determining whether there would be a transfer of control under Section 310(d).[340] Instead, comments request that we apply the revised *de facto* control standard for spectrum leasing established in *Secondary Markets* to determine whether there has been a transfer of control under Section 310(d) for infrastructure sharing.[341] Nextel, however, states that the Commission's current rules and policies do not impede the formation or implementation of infrastructure sharing arrangements and that no change to the Commission's current approach is necessary.[342]

112. *Discussion.* We believe that infrastructure sharing offers the potential for benefits to both providers and consumers. Infrastructure sharing should be encouraged because of the potential for savings in capital costs for construction of facilities necessary to deploy wireless services, and for the improved or enhanced coverage in rural and other areas that otherwise may not be economical for providers to offer without some form of sharing. As we observed in the *Rural NPRM*, infrastructure sharing arrangements have been considered in both the United States and in Europe, with apparently favorable results.[343] The actions we take today seek to further encourage beneficial infrastructure sharing arrangements.

113. We determine in this *Report and Order* that a revised *de facto* control standard, different from the *de facto* control standard under *Intermountain Microwave*, should be extended to infrastructure sharing arrangements that only involve the sharing of facilities such as physical structures and equipment. Specifically, the revised *de facto* control standard for spectrum leasing in *Secondary Markets* shall apply for interpreting whether a licensee retains *de facto* control for purposes of Section 310(d) when it is engaged in an infrastructure sharing arrangement. We believe that this policy will encourage the development of arrangements that potentially reduce costs for providers and improve coverage in rural areas. We note, however, that to the extent that licensees are sharing spectrum usage rights with third parties under spectrum leasing arrangements, such arrangements will be subject to the policies, rules, and procedures set forth in the Commission's *Secondary Markets* proceeding in WT Docket No.

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[339] *See* RCA Comments at 14, NTCH Comments at 2, Cingular Comments at 6, CTIA Comments at 15. *See also* T-Mobile Reply Comments at 3.

[340] *See* Ericsson Reply Comments at 4 (commenting with respect to "shared" networks); Nextel Partners Reply Comments at 7.

[341] Ericsson Reply Comments at 4, Cingular Comments at 6, USCC Comments at 9, AT&T Reply Comments at 11.

[342] Nextel Communications Reply Comments at 11.

[343] In the *Rural NPRM*, the Commission identified certain arrangements between various providers in the United States, including agreements to use each other's infrastructure in different geographic areas, build a network along highways in the Western and Midwestern United States, and cooperate in the building and maintaining of new wireless towers. *See Rural NPRM*, 18 FCC Rcd at 20849-50 ¶ 101. The Commission also observed that there were preliminary conclusions in Europe to view favorably certain sharing arrangements for the provision of 3G services which should allow for faster rollout and greater coverage, particularly in remote and rural areas. *Id.* at 20850 ¶ 103.

00-230.[344]

114. The Commission stated in the *Secondary Markets Report and Order* that revision of the *de facto* transfer of control test "may be warranted as the public's interests and needs change and the nature of a service evolves."[345] The Commission further stated that "continuing to focus on one type of control (*e.g.*, control over facilities) may no longer constitute the best way to further the complex and sometimes competing public interest goals of today."[346] The "sea change" that has taken place in the regulatory and technological environment for wireless services was addressed by the Commission, which identified some of the actions it has taken to promote innovative policies that seek to increase communications capacity and efficiency of spectrum use, and to make spectrum available for new uses and users.[347] Against this backdrop, comments to the *Rural NPRM* state that small regional operators often face significant financial barriers to constructing wireless networks, and that smaller communities may not be able to support a multiple number of carriers.[348] Comments confirm the benefits that may result from infrastructure sharing. For example, RCA states that sharing "should be permitted as a means to minimize capital costs among cooperating carriers and to provide service to more consumers in rural areas."[349] NTCH acknowledges that the population in many rural markets cannot sustain the number of carriers that serve in major markets, and that sharing may be a means of eliminating some capital costs.[350] CTIA states that infrastructure sharing can "play a powerful role in improving both wireless deployment and competition by reducing the costs of capital construction in rural areas."[351]

115. There have been significant changes in the communications industry since the *Intermountain Microwave de facto* standard was established over 40 years ago, including the rise of new technologies for the industry and the Commission's increasing efforts to afford quick and effective means for parties to adapt to markets and to the needs of consumers. Under these circumstances, we no longer believe that it is necessary to continue to require that a licensee exercise immediate direct control over every facility that may be operating in connection with the provision of services using its spectrum. Accordingly, we will apply the more flexible *de facto* control standard set forth in the *Secondary Markets Report and Order* when interpreting whether a licensee (or spectrum lessee) retains *de facto* control for

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[344] In addition to the provisions made available through the Commission's actions in that proceeding, licensees and other parties seeking to enter into sharing arrangements that directly include the use of spectrum licensed by the Commission are free to avail themselves of other procedures to the extent appropriate, including the filing of applications pursuant to Section 310(d) seeking full or partial assignments of licenses.

[345] *Secondary Markets Report and Order*, 18 FCC Rcd at 20631 ¶ 55.

[346] *Id.*

[347] *Id.* at 20632 ¶ 57 (discussing Commission adoption of policies to provide increased flexibility for licensees to respond quickly and effectively to evolving needs, technologies, and market developments).

[348] *See* Ericsson Reply Comments at 2, NTCH Comments at 2.

[349] RCA Comments at 14.

[350] NTCH Comments at 2-3.

[351] CTIA Comments at 15; *see also* Cingular Comments at 6 (commenting that sharing may entice carriers to extend service to rural areas where they may not otherwise deploy), USCC Comments at 8 (stating that sharing potentially could help minimize capital expenditures and maximize coverage to customers' benefit).

purposes of Section 310(d) when it is engaged in an infrastructure sharing arrangement involving facilities only.[352] Under this standard, the licensee (or spectrum lessee) remains responsible for ensuring compliance with the Communications Act and all applicable policies and rules. This responsibility includes maintaining reasonable operational oversight with respect to any activities relating to the infrastructure sharing arrangement so as to ensure that the operator of the facilities complies with all applicable technical and service rules, including safety guidelines relating to radiofrequency radiation. In addition, the licensee must retain responsibility for meeting all applicable frequency coordination obligations and resolving interference-related matters, and must retain the right to inspect the facility operations and to terminate the infrastructure sharing arrangement to ensure compliance.

116. The Commission retains the ability to investigate and terminate any infrastructure sharing arrangement to the extent it determines that the arrangement constitutes an unauthorized transfer of *de facto* control under our new standard.

117. Our elimination of the *Intermountain Microwave de facto* control standard with respect to infrastructure sharing arrangements generally, however, in no way affects the application of our rules to determine eligibility for designated entity and entrepreneur licensee status. A designated entity or entrepreneur licensee will be permitted to enter into an infrastructure sharing arrangement, without application of our unjust enrichment rules and transfer restrictions, only so long as the arrangement does not result in another entity's becoming a controlling interest or affiliate of the licensee, such that the licensee would no longer meet our eligibility requirements for designated entity or entrepreneur benefits. For these determinations, our existing attribution rules, including our definitions of controlling interest and affiliation (which incorporate the *Intermountain Microwave* principles of *de facto* control),[353] will continue to control.[354] However, in determinations involving infrastructure sharing arrangements, our attribution rules will be applied in the same manner in which, as we clarified in the *Secondary Markets Report and Order*, they are to be applied in determinations involving spectrum manager leasing arrangements.[355] We expect each designated entity or entrepreneur licensee contemplating entering into an infrastructure sharing arrangement to analyze in advance whether such an arrangement would adversely affect the licensee's ongoing eligibility for size-based benefits.[356]

118. The assessment of potential competitive effects of transactions, whether they are transfers of control, license assignments, or infrastructure sharing arrangements, remains an important element of our policies to promote facilities-based competition and guard against the harmful effects of anticompetitive conduct.[357] We believe that our encouragement of infrastructure sharing arrangements as

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[352] But see *infra* our discussion regarding infrastructure sharing arrangements involving one or more entrepreneur or designated entity licensees.

[353] *See* Amendment of Part 1 of the Commission's rules – Competitive Bidding Procedures, WT Docket No. 97-82, *Order on Reconsideration of the Third Report and Order, Fifth Report and Order, and Fourth Further Notice of Proposed Rule Making*, 15 FCC Rcd 15,293, 15,324 ¶ 61 (2000).

[354] *See* 47 C.F.R. § 1.2110.

[355] *See Secondary Markets Report and Order* at ¶¶ 78-79.

[356] Of course, we retain the right to conduct such an analysis on our own should we have any concerns about the continuing eligibility of a licensee for designated entity or entrepreneur benefits.

[357] *Id.* at 20656 ¶ 116.

potentially effective means to promote the provision of spectrum based services to rural areas is consistent with our consideration of competitive effects and potential competitive harm. Providers and consumers may be in a position to benefit from the potential for lower capital costs for facilities and improved coverage.

119. ITA expresses concern that interference issues similar to those that have been raised in other proceedings may result from infrastructure sharing arrangements, particularly with respect to the potential for interference that may result from the collocation of antennas.[358] Licensees that are parties to infrastructure sharing arrangements will be responsible for resolving all interference-related matters that may result from such arrangements in a manner consistent with the Commission's interference-based service rules. Our notification requirement that we adopt here also helps us to ensure that licensees and non-licensee parties to an arrangement are complying with our interference and non-interference related policies and rules.

120. *Potential Barriers to Infrastructure Sharing.* A number of comments request that the Commission act to remove impediments to infrastructure sharing at the state and local level, particularly as they relate to tower siting.[359] The Commission is asked to form a national policy that would seek to remove these barriers and establish direction for state and local authorities to establish clear and consistent siting policies.[360] Some comments ask generally that the Commission preempt state and local regulations that block the deployment of services in rural areas.[361]

121. Section 332(c)(7) of the Act preserves state and local authority over zoning and land use decisions for personal wireless service facilities, but also limits that authority.[362] The limitations include that state or local governments may not unreasonably discriminate among providers of functionally equivalent services, and may not regulate in a manner that prohibits or has the effect of prohibiting the provision of personal wireless services.[363] A state or local government also must act on applications within a reasonable period of time, and must make any denial of an application in writing supported by substantial evidence in a written record.[364] The statute also preempts state and local decisions to regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency (RF) emissions to the extent the facilities comply with the

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[358] ITA Comments at 9-10.

[359] *See* CTIA Reply Comments at 15-16, AT&T Reply Comments at 10-11, Western Wireless Reply Comments at 10-11. *See also* T-Mobile Reply Comments at 3-4.

[360] *See* CTIA Reply Comments at 15, AT&T Reply Comments at 10-11, Western Wireless Reply Comments at 11. See also Dobson Comments at 13 (asserting that Commission should establish a "best practices" guide for municipalities for local zoning use).

[361] *See* CTIA Reply Comments at 16, AT&T Reply Comments at 10-11.

[362] 47 U.S.C. § 332(c)(7)(A). "Personal wireless service facilities" are facilities used to provide "personal wireless services" which are commercial mobile service, unlicensed wireless services, and common carrier wireless exchange access services. *See id.* § 332(c)(7)(C)(i), (ii).

[363] *Id.* § 332(c)(7)(B).

[364] *Id.* §332(c)(7)(B)(ii), (iii).

Commission's RF rules.[365]

122. We encourage state and local authorities, when considering requests to deploy wireless facilities and when establishing facilities siting policies, to consider the impacts of their decisions on the availability of competitive wireless service. As commenters have noted, some localities have imposed tower siting requirements that make both initial construction and subsequent sharing of facilities difficult.[366] We believe that state and local governments should consider measures that would reduce regulatory burdens for those projects that are least likely to implicate local land use concerns, while retaining reasonable review processes for proposals that are more likely to have significant effects. In this regard, the Commission and its former Local and State Government Advisory Committee (LSGAC) have provided guidance to state and local authorities to assist them in devising efficient procedures for verifying that antenna facilities comply with the Commission's RF exposure guidelines.[367] We will consider offering similar guidance in the future in response to specific needs.

123. With respect to preemption, as discussed above, Section 332(c)(7) generally preserves local authority over land use decisions, and limits the Commission's authority in this area.[368] In appropriate cases, the Commission or its Bureaus have considered petitions alleging that particular regulations impinge on areas within the Commission's exclusive jurisdiction.[369] We will continue to address such issues in the future where supported by law.

124. Finally, we note that we have taken action to improve our own rules and procedures respecting other tower siting issues, including those relating to our environmental review, in order to facilitate the timely deployment of wireless services. We will continue to consider further improvements in the future where necessary.

4. Rural Radiotelephone Service/Basic Exchange Telecommunications Radio Service

125. *Background.* In the *NPRM*, the Commission sought comment on several issues related to the current use and demand for service in the Rural Radiotelephone Service (RRS) and the Basic Exchange Telecommunications Radio Service (BETRS).[370] Additionally, the Commission sought comment on whether its current rules and policies for RRS and BETRS are limiting factors towards a

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[365] *Id.* § 332(c)(7)(B)(iv).

[366] *See* CTIA Comments at 16, Dobson Comments at 13.

[367] *See* A Local Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance (June 2, 2000), < http://wireless.fcc.gov/siting/FCC_LSGAC_RF_Guide.pdf>.

[368] *Cf.* 47 U.S.C. § 332(c)(7)(B)(v) (providing that courts have exclusive jurisdiction over most complaints under Section 332(c)(7)(B)).

[369] *Cf.* Petition for Declaratory Ruling filed by Cingular Wireless LLC that Provisions of the Anne Arundel County Zoning Ordinance are Preempted as Impermissible Regulation of Radio Frequency Interference Reserved Exclusively to the Federal Communications Commission, *Memorandum Opinion and Order*, 18 FCC Rcd 13126 (WTB 2003)(preemption relating to radio frequency interference (RFI)), *app. for review pending.*

[370] *See Rural NPRM*, 18 FCC Rcd at 20853-54 ¶¶ 111-114.

more expansive use of these services.[371] As indicated in the *NPRM*, RRS was established to provide, in most instances, basic telephone service to subscribers in locations deemed so remote that traditional wireline service or service by other means is not feasible.[372] BETRS is a digital counterpart to the traditional, analog RRS, and can be characterized as more spectrally efficient than RRS, provides private calling, and has a much lower call blocking rate than RRS.[373] All RRS and BETRS authorizations are issued on a secondary, non-interfering basis.

126. Specifically, in the *NPRM*, the Commission sought comment on the current level of demand for RRS and BETRS and noted that according to its licensing records, a relatively low number of licenses have been issued for the spectrum.[374] In addition, the Commission sought comment on the demand for basic communications services, other than wireline, and inquired about how the demand is being met if it is not through the use of RRS and BETRS spectrum.[375] Furthermore, the Commission sought comment on whether access to RRS and BETRS spectrum is an impediment to the provision of these services, if a demand exists.[376]

127. With respect to current policies and rules, the Commission sought comment on the proposal to remove the eligibility restriction for BETRS that restricts the issuance of a license to only those entities that receive state approval to provide a basic exchange telephone service.[377] The Commission also sought comment on whether expanding the secondary status of RRS and BETRS to other spectrum bands would facilitate and encourage construction in rural areas.[378] Finally, the Commission sought comment on whether additional spectrum, issued on a primary basis, is needed at this time for RRS and BETRS.[379]

128. *Discussion.* We conclude that it is appropriate to remove the eligibility restrictions contained within Section 22.702 of our rules regarding state approval prior to the issuance of a BETRS license. Although no comments were received regarding this specific proposal, we believe the removal of this restriction is in the public interest. As it stands now, a potential BETRS licensee must demonstrate that it has received state approval to provide basic exchange telephone service prior to applying for a BETRS license.[380] We believe by eliminating this restriction, a potential regulatory barrier is removed and the process for gaining access to BETRS spectrum is simplified and expedited. For

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[371] *Id.* at 20854-55 ¶ 115.

[372] *Id.* at 20852 ¶ 109.

[373] *Id.*

[374] *Id.* at 20853 ¶ 112.

[375] *Id.* at 20854 ¶ 113.

[376] *Id.* at 20854 ¶ 114.

[377] *Id.* at 20854-55 ¶ 115. *See* 47 C.F.R. § 22.702.

[378] *Rural NPRM*, 18 FCC Rcd at 20854-55 ¶ 115.

[379] *Id.*

[380] 47 C.F.R. § 22.702.

example, under this approach, a carrier could seek approval from a state and the Commission at the same time, shortening deployment time. Nonetheless, we retain the current requirement that a BETRS station must be constructed within 12 months of the issuance of a license, therefore minimizing the potential for warehousing spectrum in those instances where a BETRS licensee does not receive state approval, where required, to provide basic exchange telephone service.[381]

129. As for the remaining issues raised in the *NPRM* concerning RRS and BETRS, we received very limited comment.[382] CTIA indicates that it supports efforts to survey RRS and BETRS users to determine the effectiveness of those services, and if it is shown that the spectrum is not being efficiently utilized, the Commission should reallocate the current RRS and BETRS spectrum to more efficient and commercially viable uses.[383] While we fully support efficient utilization and deployment of RRS and BETRS, we find it unnecessary to survey users at this time. Specifically, the current allocation for RRS and BETRS is secondary to the Paging Radiotelephone (paging) service and the Specialized Mobile Radio (SMR) service, which have both been auctioned and licenses issued on a geographic basis. Thus, even if RRS and BETRS licensees were found not operating, the spectrum would remain allocated to the paging and SMR services. Further, given the lack of support in the comments for a primary allocation of RRS and BETRS or the expansion of the secondary use of RRS and BETRS to other spectrum, we decline to take action on such proposals.

IV. FURTHER NOTICE OF PROPOSED RULE MAKING

A. Introduction

130. The widespread provision of communications services is not only one of the Commission's primary public policy objectives, but also one of its statutory mandates. The Commission has as its primary mission the promotion of "communication by wire and radio so as to make available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex, a rapid, efficient, Nation-wide, and world-wide wire and radio communication service."[384] In addition, the Omnibus Budget Reconciliation Act of 1993 added Section 309(j) to the Communications Act, which requires the Commission to promote various objectives in designing a system of competitive bidding.[385] A number of these objectives focus on the provision of spectrum-based services to rural areas, such as encouraging the development and rapid deployment of new technologies, products, and services for the benefit of the public, "including those residing in rural areas."[386] In addition to the rural service objectives mandated by Section 309(j), Congress directed the

[381] *See id.* § 22.713.

[382] *See* CTIA Comments at 17, Nextel Partners Comments at 20-21. Nextel Partners indicates, generally, that the Commission should find economic means to provide the target populations of RRS and BETRS subscribers with up-to-date mobile wireless services. We believe Nextel Partners comments lack sufficient detail and are beyond the scope of the *Rural NPRM*.

[383] *See* CTIA Comments at 17.

[384] 47 U.S.C. § 151.

[385] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 6002, 107 Stat. 312, 387-397 (codified at 47 U.S.C. § 309(j) (1993)).

[386] 47 U.S.C. § 309(j)(3)(A).

Commission to pursue other broader public interest goals. Specifically, Section 309(j)(3) requires the Commission to promote efficient and intensive use of the spectrum, encourage economic opportunity and competition, and recover for the public a portion of the value of the public spectrum.[387] Given these statutory obligations, the Commission's spectrum policy goals include facilitating the efficient use of spectrum, as well as fostering competition, and rapid, widespread service consistent with the goals of the Communications Act.[388]

131. As noted in the *Report and Order*, our current policies and rules generally facilitate rural development of wireless services where it is economic to do so.[389] The competitive bidding process and related performance and other requirements for successful bidders, including existing substantial service and flexible use policies, encourage licensees to make productive and innovative use of spectrum. In addition, our secondary market mechanisms provide on-going opportunities for new entrants to gain access to spectrum from those licensees as market conditions change, thereby ensuring that spectrum moves to its highest valued uses over time. We believe that, insofar as they have economic incentives to do so, new wireless service providers will choose to enter rural markets and existing rural service providers will extend their presence further into the rural areas where they operate.

132. As we acknowledge in the *Report and Order*, however, there may be circumstances in which our market-oriented policies are insufficient to foster access to spectrum and deployment of service in rural areas.[390] In such cases, we will continue to consider the adoption of appropriate performance requirements, along with other means, for both existing and future licenses to further encourage the provision of wireless service to rural areas.[391] Accordingly, in this *Further Notice*, we build on the record accumulated in response to the *Rural NPRM* and we seek comment on the appropriate mechanisms to further ensure that spectrum ultimately continues to be put to its highest valued use. In particular, we seek additional comment on the effectiveness of our partitioning, disaggregation, spectrum leasing and other market-based policies and rules in making wireless services available to more rural areas. We also seek comment on our potential use of "keep-what-you-use" re-licensing mechanisms, renewal term substantial service requirements, as well as other alternatives to move unused or underused spectrum to those who may be able to use it more intensively. We also seek comment on the economic impacts of employing such approaches and whether different services may benefit from different approaches to expanded spectrum access.

133. As noted above, service to rural areas may be delayed because entities that are otherwise willing and able to deploy service lack access to spectrum. The increasing use of unlicensed wireless technologies and applications in rural areas suggests that operators will deploy service if there is availability of or access to spectrum with which to do so.[392] Accordingly, we undertake this further

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[387] *Id.* § 309(j)(3)(B)-(D).

[388] 47 U.S.C. §§ 151, 309(j).

[389] *See supra* ¶¶ 37-39.

[390] *See supra* ¶¶ 39-41.

[391] *See supra* ¶ 39.

[392] For example, in an annual survey of its members, the National Telecommunications Cooperative Association (NTCA) found that, in four years the percentage of rural telcos offering broadband to their customer base jumped to 92 percent with 22 percent of those providers using unlicensed wireless (along with other technologies) to reach

(continued....)

inquiry to assess alternative methods that will ensure that spectrum rights flow to those who are willing and able to put spectrum to use in rural areas.

134. In this *Further Notice*, we seek to explore whether changing our method for enforcing performance requirements or adding renewal term performance requirements could have a beneficial impact on the deployment of wireless service to rural areas. In this regard, this section examines how the licensing of wireless services has evolved from a "keep what you use" standard to a "complete forfeiture" approach. The following paragraphs provide an overview of the development of licensing models and performance standards, while also providing the Commission's rationale behind these policy shifts.

B. Background

135. *Site-by-site Construction.* Initially, the Commission licensed mobile and fixed wireless services on a site-by-site and frequency-by-frequency basis.[393] Licensees were authorized to operate a station only at a specific location, using a specific frequency or frequencies. Some examples of this type of licensing approach include one or more base stations with mobile units in the vicinity, or a fixed communications path between two points.[394] With this type of site-specific licensing, the Commission adopted a "keep what you use" performance requirement, meaning that at the end of a licensee's construction period, any unconstructed areas or frequencies came back under Commission control for re-licensing on a first-come, first served (often pre-coordinated) site-by-site basis. In this regard, the Commission sought to ensure timely use of spectrum and "to ensure that the channels which we make available to eligibles are put in 'use' and not put in 'storage.'"[395]

136. For example, the Commission's original rules governing 800 MHz SMR were designed to license dispatch radio systems on a transmitter-by-transmitter basis in local markets.[396] The Commission typically gave an 800 MHz SMR licensee up to 12 months after the grant of a license to construct and begin operation of its facilities, meaning that each licensed site and frequency had to be up

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their customers. *See* NTCA 2004 Broadband/Internet Availability Survey Report (June 2004). *See also* comments submitted in the Federal Communications Commission's 2004 Wireless Broadband Forum, held May 19, 2004, citing the use of unlicensed wireless in rural communities: Kevin Werback, New America Foundation and Public Knowledge, "The Coming Age of Unlicensed Wireless Radio Revolution"; Patrick Leary, Alvarion, Inc., "Rural U.S. Examples of Wireless Broadband Deployments."

[393] *See, e.g.*, An Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz and Amendment of Parts 2, 18, 21, 73, 74, 89, 91 and 93 of the Rules Relative to Operations in the Land Mobile Service Between 806-960 MHz, Docket No. 18262, *Memorandum Opinion and Order*, 51 FCC 2d 945 ¶ 128 (1975) (*806-960 MHz MO&O*).

[394] For example, a typical site-based use is dispatch service. Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units, *e.g.*, between a taxicab dispatch office and a taxi, or between two or more mobile units, such as between a car and a truck.

[395] *806-960 MHz MO&O*, 51 FCC 2d at ¶ 128.

[396] Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144, *First Report and Order, Eighth Report and Order* and *Second Further Notice of Proposed Rulemaking*, 11 FCC Rcd 1463, 1474 ¶ 4 (1995) (*SMR Report and Order*).

and running within one year.[397] At the end of that time period, licensed areas and frequencies that were unconstructed reverted back to the Commission for re-licensing.[398]

137. *Hybrid Licensing.* As technology evolved, mobile wireless providers sought to expand their reach and to provide service over a wide area. Two different approaches of "wide-area" licensing developed in response to increasing demand for new services: the SMR model and the cellular model. While these approaches permitted SMR and cellular carriers to operate within a wide-area footprint, the Commission's site-specific licensing rules and "keep what you use" policy still applied.

138. For example, responding to growing demand for mobile telephony and limited capacity, SMR licensees sought to operate technically innovative, wide-area systems. Because of the complexity and expense of building these systems, however, licensees were frequently unable to provision service within the 8 to 12 month time frame required by Commission rules.[399] Beginning in 1991, the Commission granted waivers and extended implementation authority to many SMR licensees, giving them authority to expand the geographic scope of their services and combine large numbers of channels in order to provide service intended to compete with cellular.[400] Applicants who were granted waivers or extended implementation authority received additional time to construct the licensed spectrum. However, applicants still had to apply for each site individually and in the event the licensee did not construct and operate the frequencies within the extended time period, the unused spectrum came back under Commission control for re-licensing.

139. In contrast, wide-area licensing for the cellular radiotelephone service followed a different path. In establishing commercial licensing of cellular in 1981, the Commission recognized the need to define cellular service areas while also providing authorized cellular operators with the freedom they needed to adapt their systems in the face of growing and changing demand.[401] The Commission established a regulatory structure centered around cellular geographic service areas (CGSAs) that would be defined by license applicants themselves as the areas within a market that they intended to serve. An applicant was required to serve at least 75 percent of its CGSA.[402] The Commission soon after added an additional rule, requiring applicants to define their CGSAs to cover at least 75 percent of the population

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[397] Construction periods for such licensees were originally 8 months in duration. Construction periods were extended to a uniform 12-month period for all commercial mobile radio service licensees in August 1994. Implementation of Sections 3(n) and 332 of the Communications Act, PR Docket No. 89-553, *Third Report and Order*, 9 FCC Rcd 7988, 8074 ¶ 177 (1994).

[398] Amendment of Part 90 of the Commission's Rules Governing Extended Implementation Periods, PR Docket No. 92-210, *Report and Order*, 8 FCC Rcd 3975 ¶ 2 (1993) (*Extended Implementation Report and Order*).

[399] Amendment of Part 90 of the Commission's Rules Governing Extended Implementation Periods, PR Docket No. 92-210, *Notice of Proposed Rule Making*, 7 FCC Rcd 6587 ¶ 3 (1992) (*Extended Implementation NPRM*).

[400] *See, e.g.*, Fleet Call, Inc., *Memorandum Opinion and Order*, 6 FCC Rcd 1533, reconsideration dismissed, 6 FCC Rcd 6989 (1991). *See* also *Extended Implementation Report and Order*, 8 FCC Rcd at 3975-76 ¶ 6.

[401] An Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems, CC Docket No. 79-318, *Report and Order*, 86 FCC 2d 469 ¶ 96 (1981) (*Cellular Report and Order*).

[402] *Id.* at ¶ 97.

or area of the corresponding MSA[403] or RSA.[404] Carriers operating in MSAs were required to place their cellular stations into operation within 36 months of the initial license grant,[405] while operators in RSAs had 18 months to construct.[406] In addition, the Commission afforded licensees a five-year "fill-in" period in which a licensee could apply to expand the boundaries of its CGSA within the MSA/RSA without the worry of competing interests from another applicant.[407]

140. As the popularity of cellular service began to grow, the Commission determined that it was not in the public interest to allow a cellular licensee to protect unserved territory for an unlimited period of time simply because the territory was part of its CGSA.[408] The Commission, therefore, imposed a "keep-what-you-use" regime on all cellular licenses, and established rules and procedures for accepting applications to operate new cellular systems in areas still unserved at the expiration of the incumbent's five-year "fill-in" period.[409] In addition, the Commission adopted rules determining the size of CGSAs by a mathematical formula and redefined the boundaries authorized for existing cellular systems to more closely mirror the areas of actual construction and coverage so that potential licensees for the cellular unserved areas would have a clearer picture of which areas were available.[410] At the end of the five year "fill-in" period, any unused spectrum reverted back to the Commission for re-licensing. New licenses authorized as a result of the unserved area licensing rules are licensed on a site-specific basis, and licensees are required to complete construction and provide service to the public within one year of the initial authorization grant.[411]

141. *Geographic Area-based Approach.* While the hybrid licensing models did help to

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[403] Amendment of the Commission's Rules To Allow the Selection from Among Mutually Exclusive Competing Cellular Applications Using Random Selection or Lotteries Instead of Comparative Hearings, CC Docket No. 83-1096, *Report and Order*, 98 FCC 2d 175 ¶ 67 (1984).

[404] Amendment of the Commission's Rules for Rural Cellular Radio Service, CC Docket No. 85-388, *First Report and Order*, 60 Rad. Reg. 2d (P & F) 1029 ¶ 28 (1986) (*Rural Cellular Report and Order*).

[405] *Cellular Report and Order*, 86 FCC 2d 469, App. C.

[406] *Rural Cellular Report and Order*, 60 Rad. Reg. 2d at ¶ 28.

[407] Amendment of the Commission's Rules for Rural Cellular Service, CC Docket No. 85-388, *Order on Reconsideration of Second Report and Order*, 4 FCC Rcd 5377 ¶ 15 (1989).

[408] Amendment of Part 22 of the Commission's Rules to Provide for Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify Other Cellular Rules, CC Docket No. 90-6, *Notice of Proposed Rule Making*, 5 FCC Rcd 1044 ¶ 24 (1990) (*Unserved Area NPRM*).

[409] Amendment of Part 22 of the Commission's Rules to Provide for Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify Other Cellular Rules, CC Docket No. 90-6, *First Report and Order* and *Memorandum Opinion and Order on Reconsideration*, 6 FCC Rcd 6185 ¶¶ 18-22 (1991) (*Unserved Area Report and Order*).

[410] Amendment of Part 22 of the Commission's Rules to Provide for Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify Other Cellular Rules, CC Docket No. 90-6, *Second Report and Order*, 7 FCC Rcd 2449 ¶¶ 8-12 (1992) (*Unserved Area Second Report and Order*).

[411] *Unserved Area Report and Order*, 6 FCC Rcd at ¶ 93.